UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/709,341	04/29/2004	Do-Kyoung Kwon	MTKP0168USA	3340

27765 7590 10/02/2007

NORTH AMERICA INTELLECTUAL PROPERTY CORPORATION
P.O. BOX 506
MERRIFIELD, VA 22116

EXAMINER
VO, TUNG T

ART UNIT	PAPER NUMBER
2621	

NOTIFICATION DATE	DELIVERY MODE
10/02/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

winstonhsu.uspto@gmail.com
Patent.admin.uspto.Rcv@naipo.com
mis.ap.uspto@naipo.com.tw

Office Action Summary	Application No.	Applicant(s)	
	10/709,341	KWON ET AL.	
	Examiner	Art Unit	
	Tung Vo	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *03* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2 and 17-21* is/are rejected.

7)☐ Claim(s) *3-16* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 April 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *04/29/04; 05/17/04; 05/03/07*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1 and 18-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Joch et al. (US 7,227,901) in view of Frishman et al. (US 2003/0044080).

Re claim 1. Joch teaches a method for reducing a blocking artifact in a video stream (44 of fig. 4; figs. 5-7), the method comprising:

calculating an activity value representing local activity around a block boundary between a plurality of adjacent blocks in the video stream (112, 114, and 115 of fig. 5; col. 3, lines 5-8; 48-52);

determining a region mode for the block boundary according to the activity value (116 and 120 of fig. 5) and

filtering a plurality of pixels around the block boundary according to the region mode (122, 128, 130, 132, and 134 of fig. 5) and the quantization parameters (QPs) of the adjacent blocks (col. 15, lines 15-20), wherein the filtered pixels are further refined according to the quantization parameters (QPs) of the adjacent blocks (col. 16, lines 65-col. 17, line 11), or wherein symmetric filters (q0 and p0 of fig. 3, values p0 and q0 are symmetric to the boundary, this would suggest the filters will perform symmetrically; col. 17, lines 23-29) or asymmetric

filters (128, 130, 132, and 134 of fig. 5) are used to filter the pixels according to the quantization parameters (QPs) of the adjacent blocks.

The symmetric and asymmetric filters are used in the de-blocking processes that are well known in the art as taught by Frishman ([0015]-[0016]).

Therefore, taking the teachings of Joch and Frishman together as a whole, it would have been obvious to one of ordinary skill in the art to incorporate the symmetric and asymmetric filters of Frishman into the de-blocking process of Joch to provide a post-processing operation in order to improve and enhance picture quality, or used as an in-loop operation in order to enhance image quality and improve the process of estimating motion within the compression loop.

Re claim 18, Joch further discloses determining a filtering range according to block coding types (inter or intra coding types, col. 11, lines 1-11) of the adjacent blocks in the video stream; wherein the filtering range specifies a number of pixels to filter around the block boundary (col. 11, lines 8-11, wherein inter coded (not intra coded) block size ranging from 16x16 pixels to 4x4 pixels, so the intra-coded block size would obviously 4x4 pixels).

Re claim 19, Joch further teaches wherein according to the block coding types (inter coded block size ranging 16x16 pixels to 4x4 pixels; intra code block size 4x4 pixels to zero; col. 11, lines 8-11) of the adjacent blocks in the video stream, determining the filtering range to be up to eight pixels around the block boundary (25 and 47 of fig. 3a).

Re claim 20, Joch further teaches wherein determining a filtering range according to the block coding types of the adjacent blocks in the video stream (col. 11, lines 8-11) further comprises:

if at least one of the adjacent blocks is an intra-coded block (Each inter-coded macroblock 24 can be partitioned in a number of different ways, using blocks of seven different sizes, with luminance block sizes ranging from 16.times.16 pixels to 4.times.4 pixels, col. 11, lines 8-11, this would obviously suggest the intra coded , where block size would be 4x4 pixels), determining the filtering range to be up to four pixels around the block boundary; and if none of the adjacent blocks are intra-coded blocks (intra coded blocks, col. 11, lines 8-11), determining the filtering range to be up to eight pixels around the block boundary (16x16 pixels to 4x4 pixels, col. 11, lines 8-11).

Re claim 21, Joch further teaches wherein the video stream is an MPEG video stream (25 of fig. 29).

3. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Joch et al. (US 7,227,901) in view of Frishman et al. (US 2003/0044080) as applied to claim 1, and further in view of Ameres et al. (US 7,027,654).

Re claim 2, Joch teaches the content activity measure is derived from the absolute value of the separation between sample values of p0, p1, q0, q1 on either side of the boundary 47 (col. 13, lines 23-28) , and Frishman discloses an absolute difference is then calculated between each two neighbors (9 pairs)[0005].

It is noted that the combination of Joch and Frishman does not particularly teach wherein calculating the activity value comprises summing absolute differences between pixels V around the block boundary as follows:

$$\text{ACTIVITY} = \sum_{i=3}^{6} |v_i - v_{i+1}| + \sum_{i=11}^{14} |v_i - v_{i+1}|$$

However, Ameres teaches calculating the activity value (col. 5, lines 1-10) comprises summing absolute differences between pixels V around the block boundary using the formulas (col. 5, lines 1-10) follows:

$$Side1SAD = \sum_{i=1}^{4} \text{abs}(x_i - x_{i-1})$$

$$Side2SAD = \sum_{i=5}^{9} \text{abs}(x_i - x_{i-1})$$

Taking the teachings of Joch, Frishman, and Ameres as a whole, it would have been obvious to one of ordinary skill in the art to incorporate the teachings of Ameres into the combination of Joch and Frishman in order to reduce the decoder complexity on vector processing machines that are capable of doing the same operation to multiple values stored sequentially in a machine's registers by lowering the complexity of the 2 dimensional transform and decoding time.

4. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Joch et al. (US 7,227,901) in view of Frishman et al. (US 2003/0044080) as applied to claim 1, and further in view of Hsu et al. (US 2005/0013497).

Re claim 17, Joch further teaches if the video stream comprises video frame, performing an interpolation operation to estimate pixel values in frames before filtering the pixels around the block boundary (col. 11, lines 27-29). Joch and Frishman do not teach if the video stream comprises interlaced video, performing an interpolation operation to estimate pixel values in an interlaced field before filtering the pixels around the block boundary as claimed.

Hsu teaches a video decoder decodes a motion vector for a current interlaced macroblock (e.g., a frame or field macroblock) and obtains a prediction macroblock for the current macroblock using the decoded motion vector [0043], this would obviously suggest if the video stream comprises interlaced video, performing an interpolation operation to estimate pixel values in an interlaced field.

Therefore, taking the teachings of Joch, Frishman, and Hsu as a whole, it would have been obvious to one of ordinary skill in the art to modify the teachings of Hsu into the combination of Joch and Frishman in order to provide rounding leads to lower implementation costs by favoring less complicated positions for interpolation (e.g., integer and half-integer locations).

Allowable Subject Matter

5. Claims 3-16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: Either Joch, Frishman, Hsu, or Ameres does not particularly teach or suggest if at least one of the adjacent blocks is an intra-coded block:

if the activity value is greater than a first threshold, determining the region mode to be an active region;

if the activity value is less than the first threshold but greater than a second threshold, determining the region mode to be a smooth region; and

if the activity value is less than the second threshold, determining the region mode to be a dormant region; and

if none of the adjacent blocks are intra-coded blocks:

if the activity value is greater than a third threshold, determining the region mode to be an active region;

if the activity value is less than the third threshold but greater than the second threshold, determining the region mode to be a smooth region; and

if the activity value is less than the second threshold, determining the region mode to be a dormant region as specified in claim 3.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Yu et al. (US 6,823,089) discloses method of determining the extent of blocking and contouring artifacts in a digital image.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tung Vo whose telephone number is 571-272-7340. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri can be reached on 571-272-7418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Tung Vo
Primary Examiner
Art Unit 2621